FIG. 1

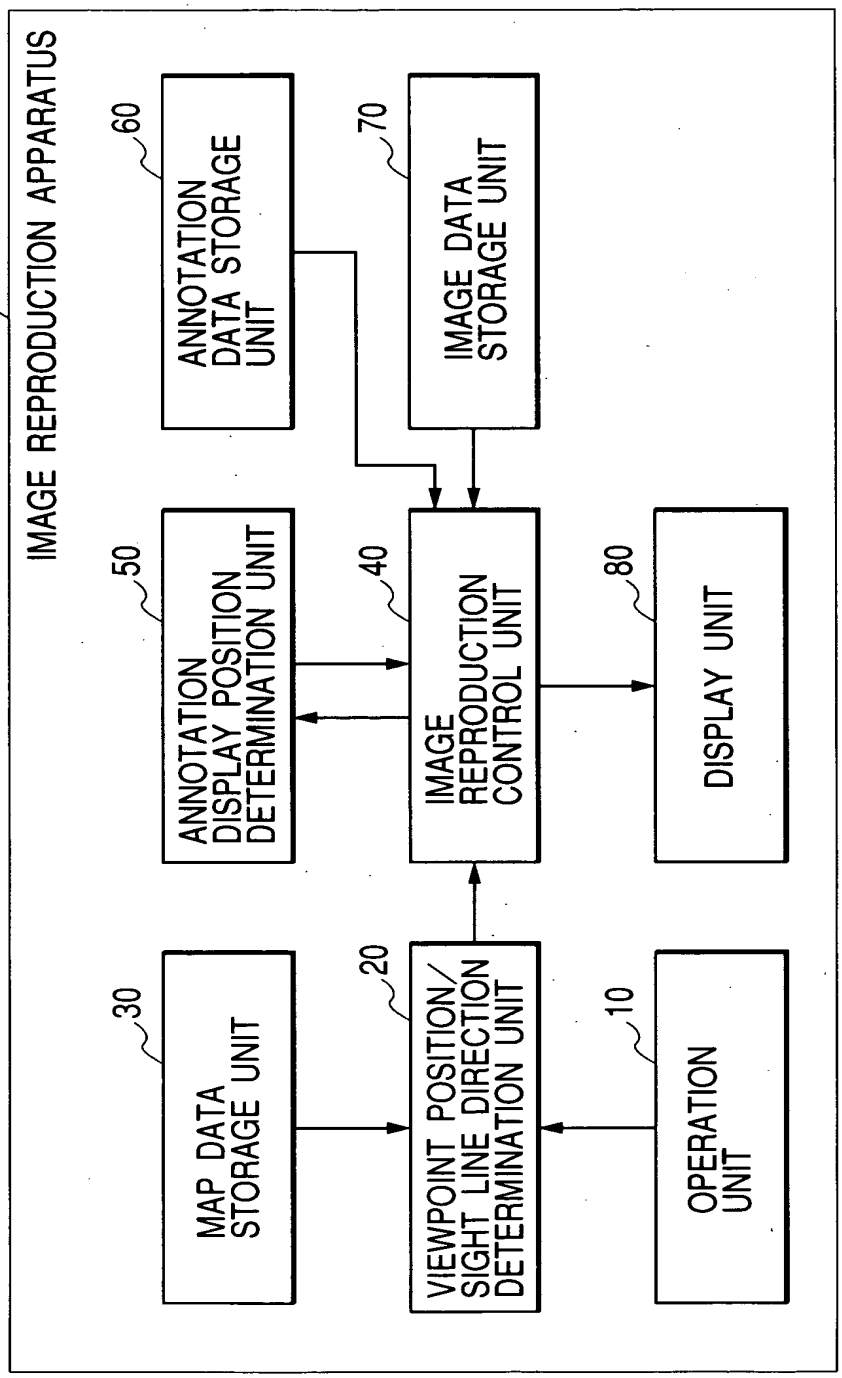
IMAGE REPRODUCTION APPARATUS
1
ANNOTATION DATA STORAGE UNIT
60
IMAGE DATA STORAGE UNIT
70
ANNOTATION DISPLAY POSITION DETERMINATION UNIT
50
IMAGE REPRODUCTION CONTROL UNIT
40
DISPLAY UNIT
80
MAP DATA STORAGE UNIT
30
VIEWPOINT POSITION/ SIGHT LINE DIRECTION DETERMINATION UNIT
20
OPERATION UNIT
10

FIG. 2

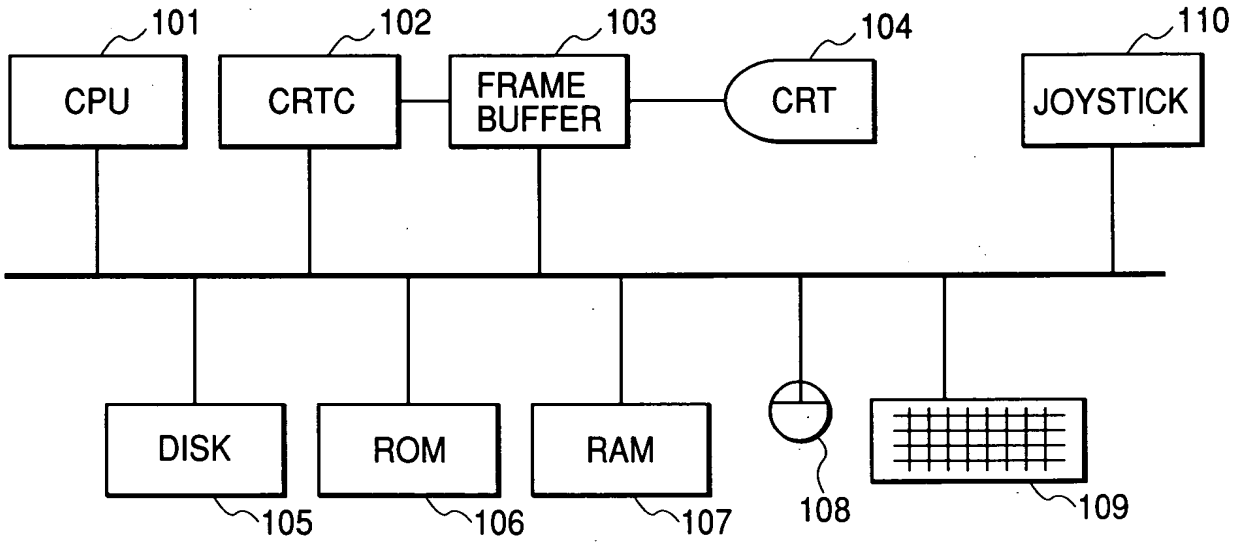
101
102
103
104
110
CPU
CRTC
FRAME BUFFER
CRT
JOYSTICK
DISK
ROM
RAM
105
106
107
108
109

FIG. 3

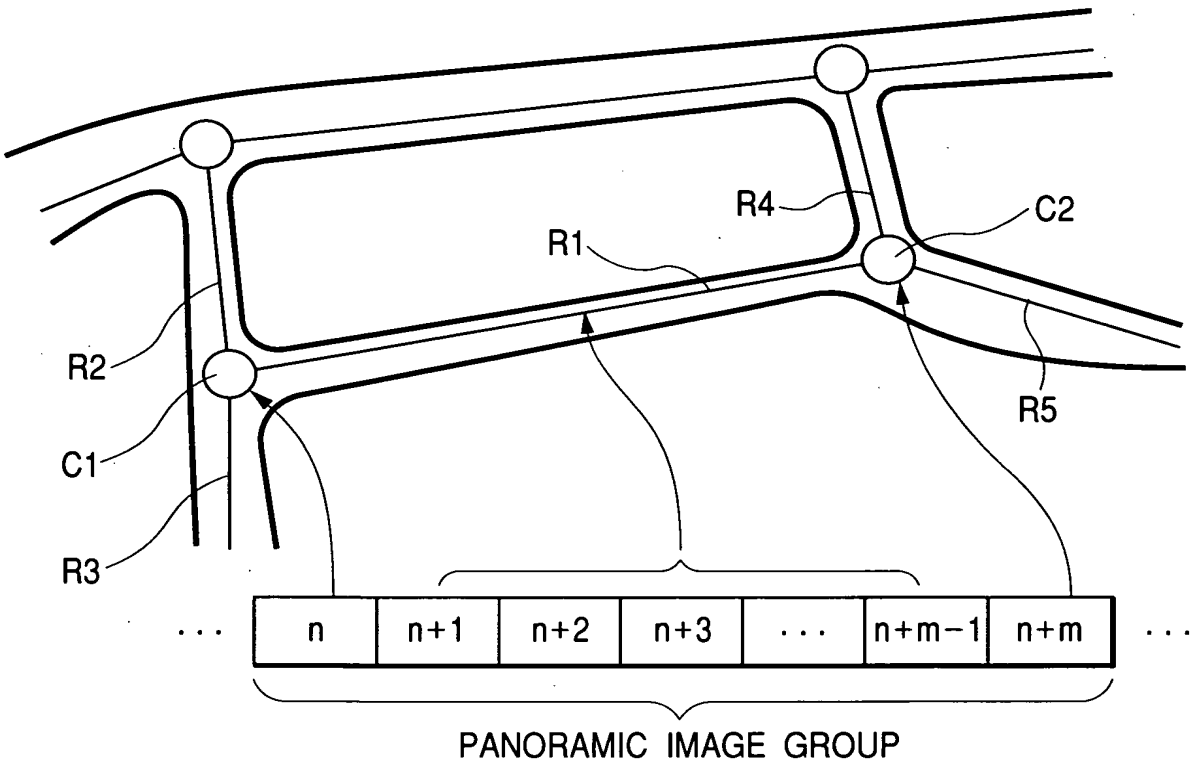

FIG. 4

ATTRIBUTES OF SECTION POINTS

ID	FRAME NUMBERS	CONNECTED ROUTES	TWO-DIMENSIONAL COORDINATES ON MAP
C1	n	R1, R2, R3	(x1, y1)
C2	n+m	R1, R4, R5	(x2, y2)

ATTRIBUTE OF ROUTE

ID	SECTION POINTS OF BOTH ENDS	FRAME NUMBERS	TWO-DIMENSIONAL COORDINATES ON MAP
R1	C1, C2	n+1	{x(n+1), y(n+1)}
		n+2	{x(n+2), y(n+2)}
		...	...
		n+m−1	{x(n+m−1), y(n+m−1)}

FIG. 5

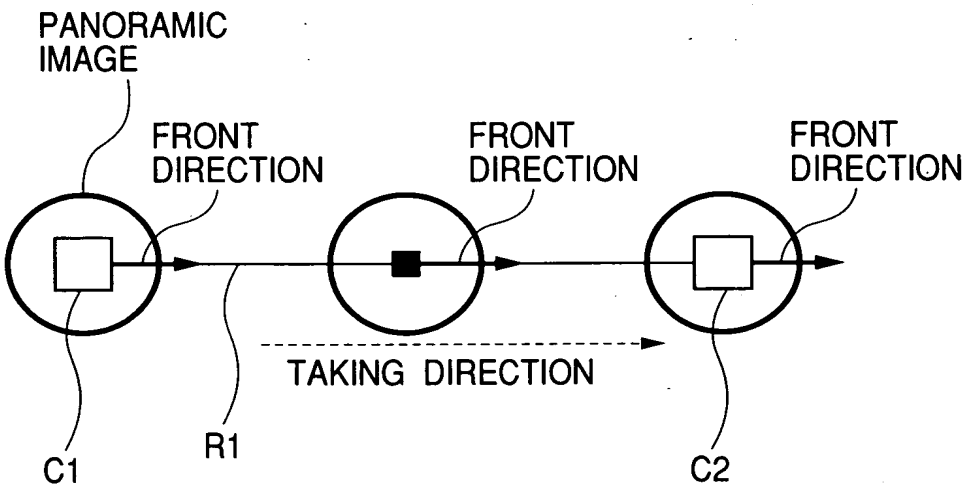
PANORAMIC IMAGE
FRONT DIRECTION
FRONT DIRECTION
FRONT DIRECTION
TAKING DIRECTION
C1
R1
C2

FIG. 6

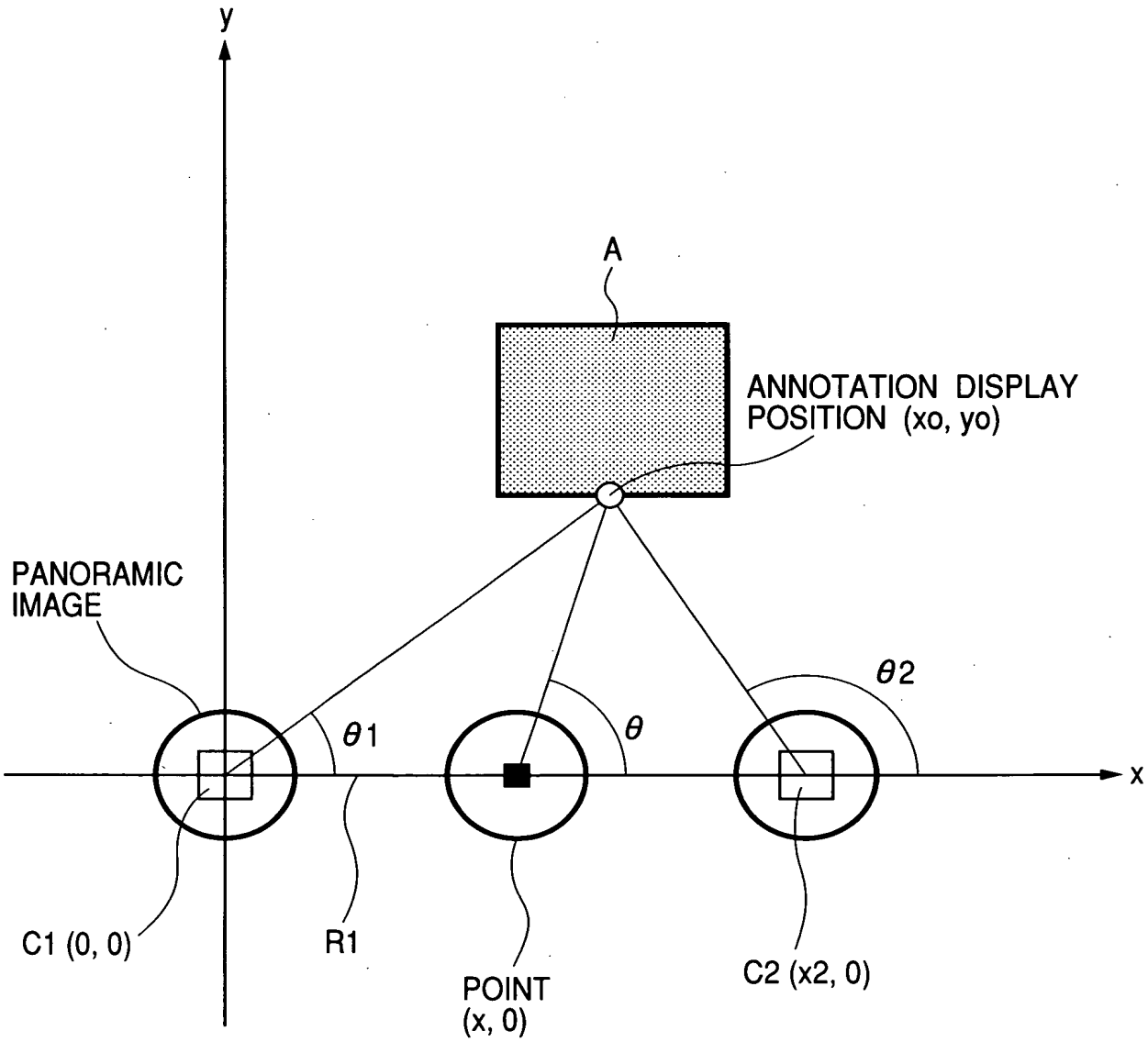
y
A
ANNOTATION DISPLAY
POSITION (xo, yo)
PANORAMIC
IMAGE
θ1
θ
θ2
x
C1 (0, 0)
R1
POINT
(x, 0)
C2 (x2, 0)

FIG. 7

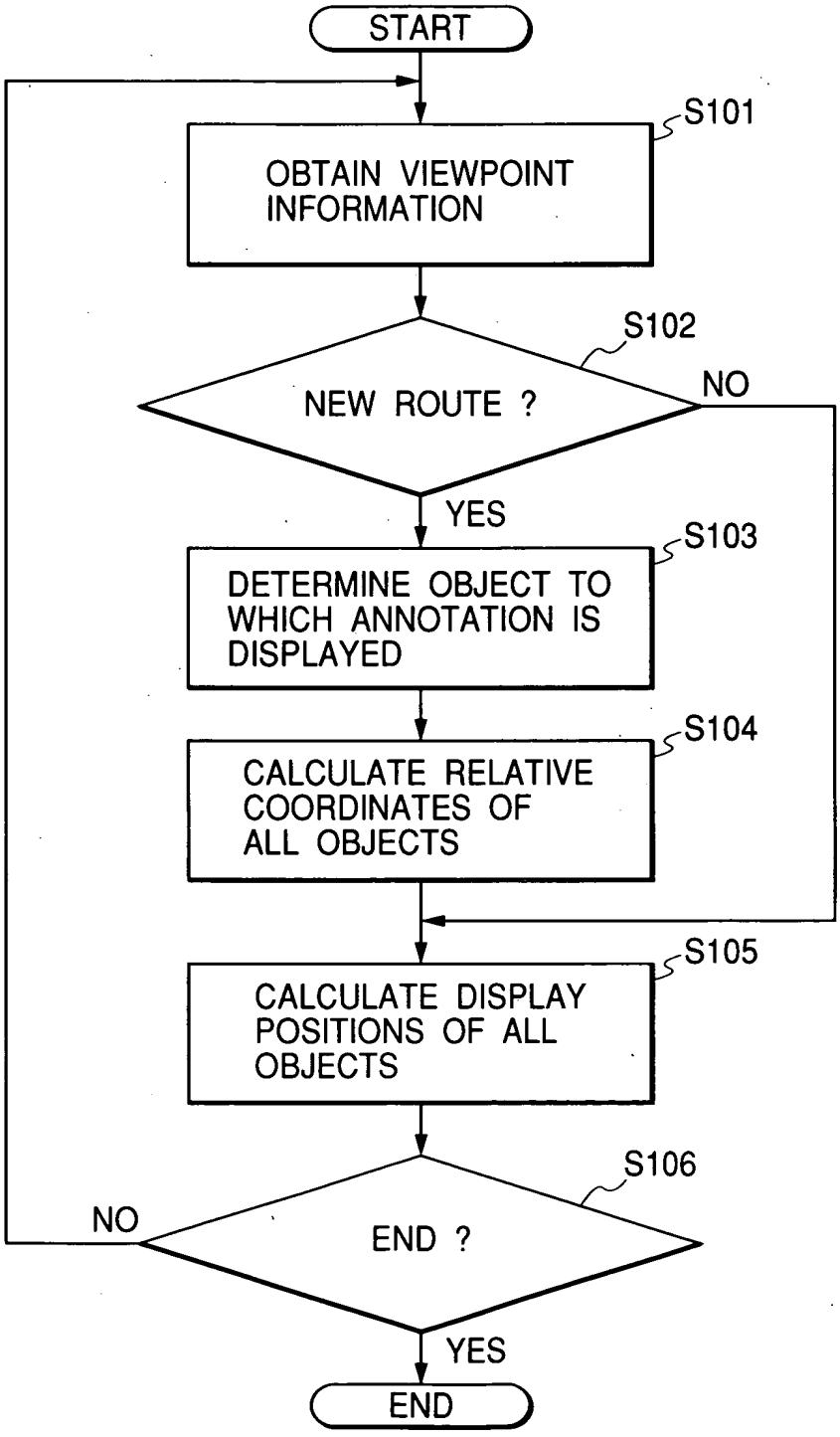
START
S101
OBTAIN VIEWPOINT INFORMATION
S102
NEW ROUTE ?
NO
YES
S103
DETERMINE OBJECT TO WHICH ANNOTATION IS DISPLAYED
S104
CALCULATE RELATIVE COORDINATES OF ALL OBJECTS
S105
CALCULATE DISPLAY POSITIONS OF ALL OBJECTS
S106
END ?
NO
YES
END

FIG. 8

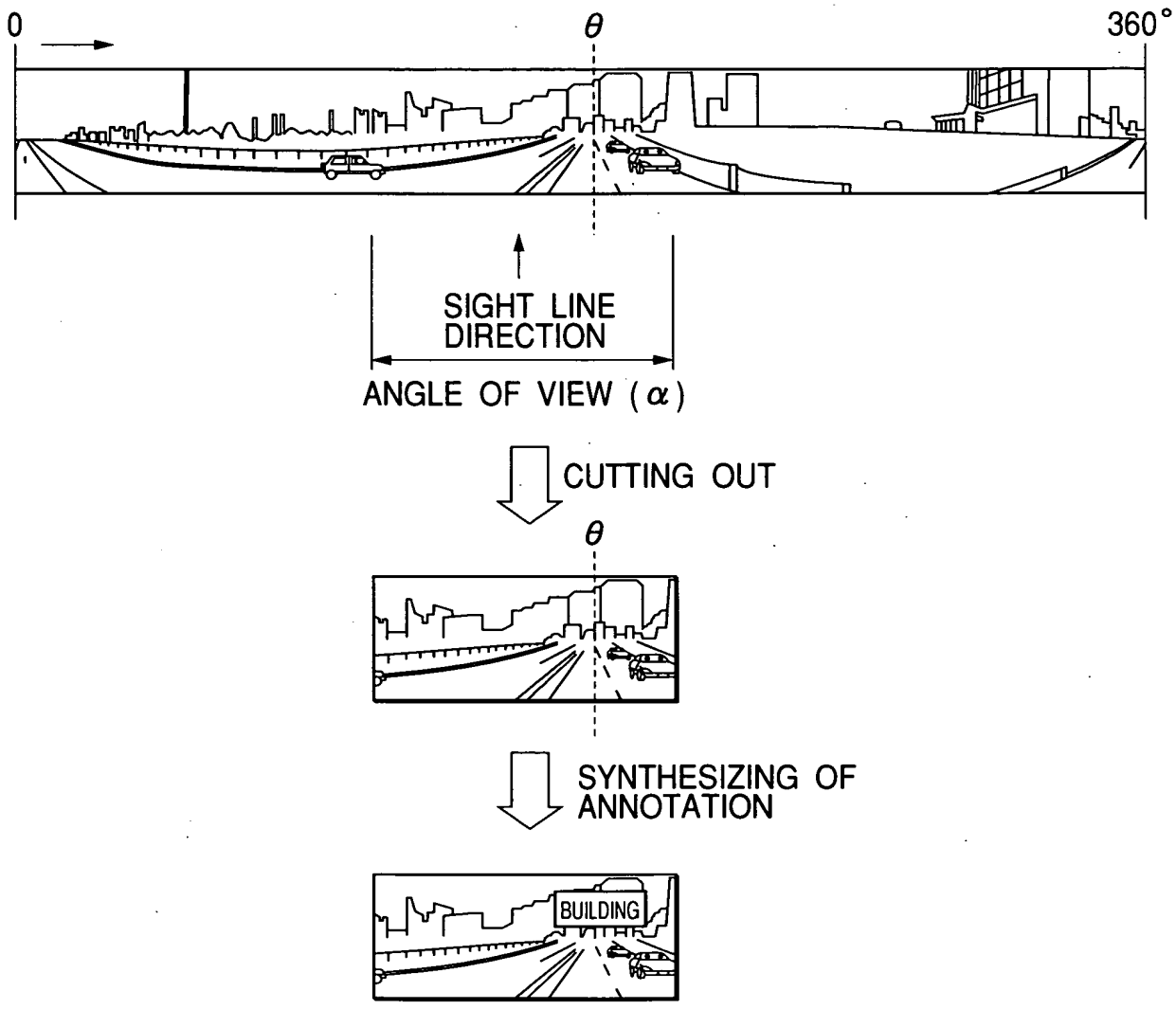
0
θ
360°
SIGHT LINE DIRECTION
ANGLE OF VIEW (α)
CUTTING OUT
θ
SYNTHESIZING OF ANNOTATION
BUILDING

FIG. 9

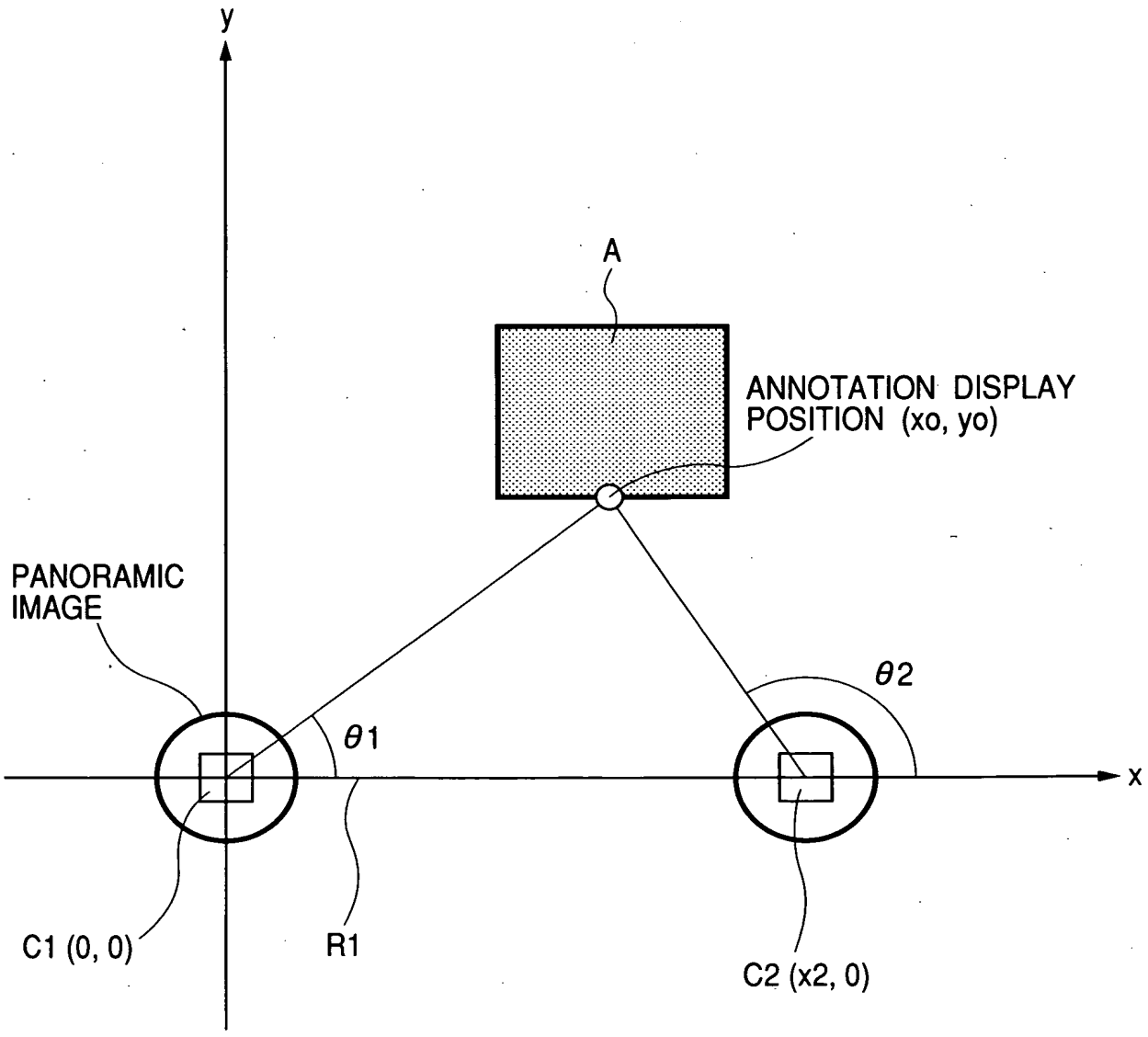
y
A
ANNOTATION DISPLAY POSITION (xo, yo)
PANORAMIC IMAGE
θ1
θ2
x
C1 (0, 0)
R1
C2 (x2, 0)

FIG. 10

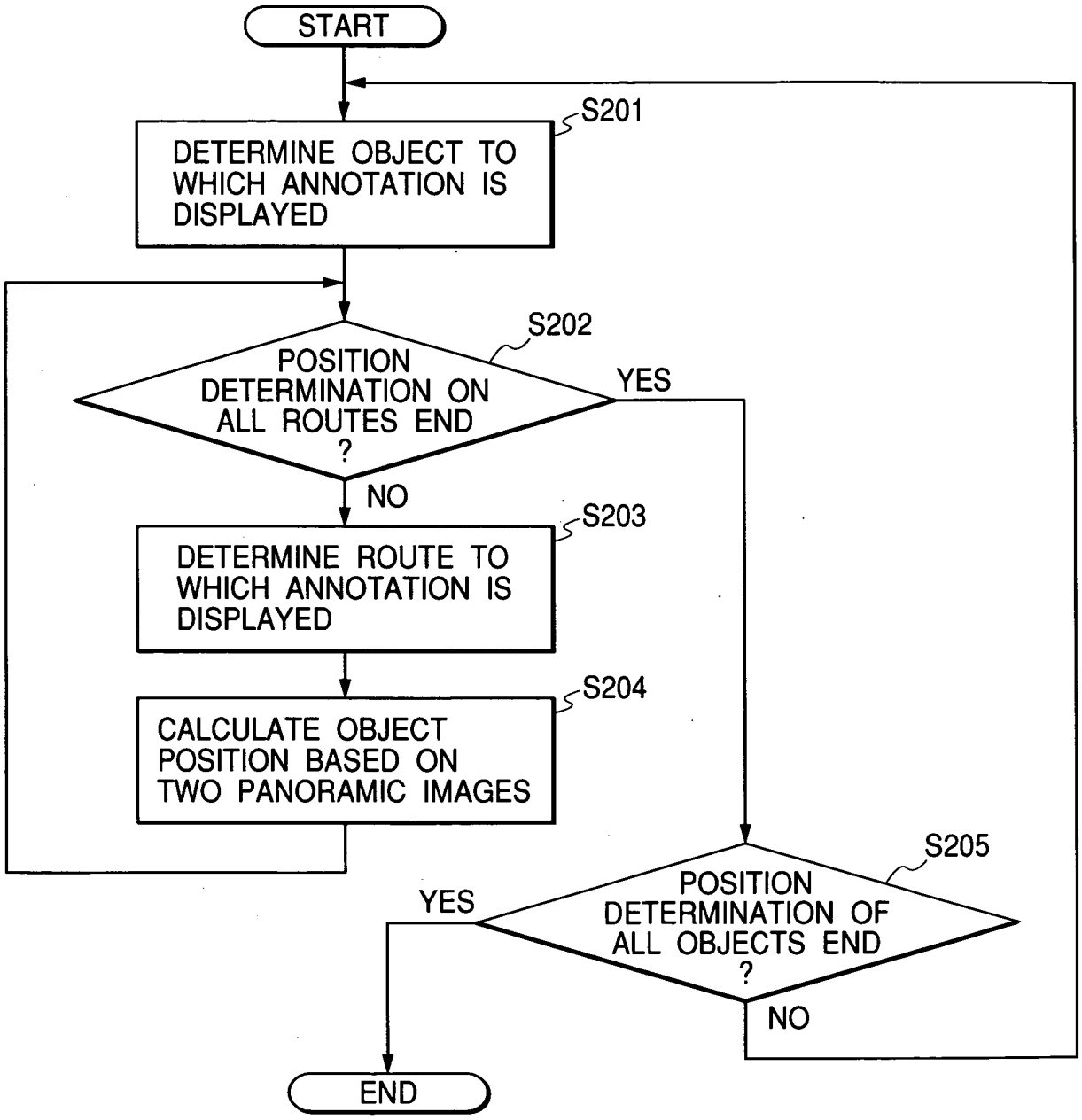
START
S201
DETERMINE OBJECT TO WHICH ANNOTATION IS DISPLAYED
S202
POSITION DETERMINATION ON ALL ROUTES END ?
YES
NO
S203
DETERMINE ROUTE TO WHICH ANNOTATION IS DISPLAYED
S204
CALCULATE OBJECT POSITION BASED ON TWO PANORAMIC IMAGES
S205
POSITION DETERMINATION OF ALL OBJECTS END ?
YES
NO
END

FIG. 11

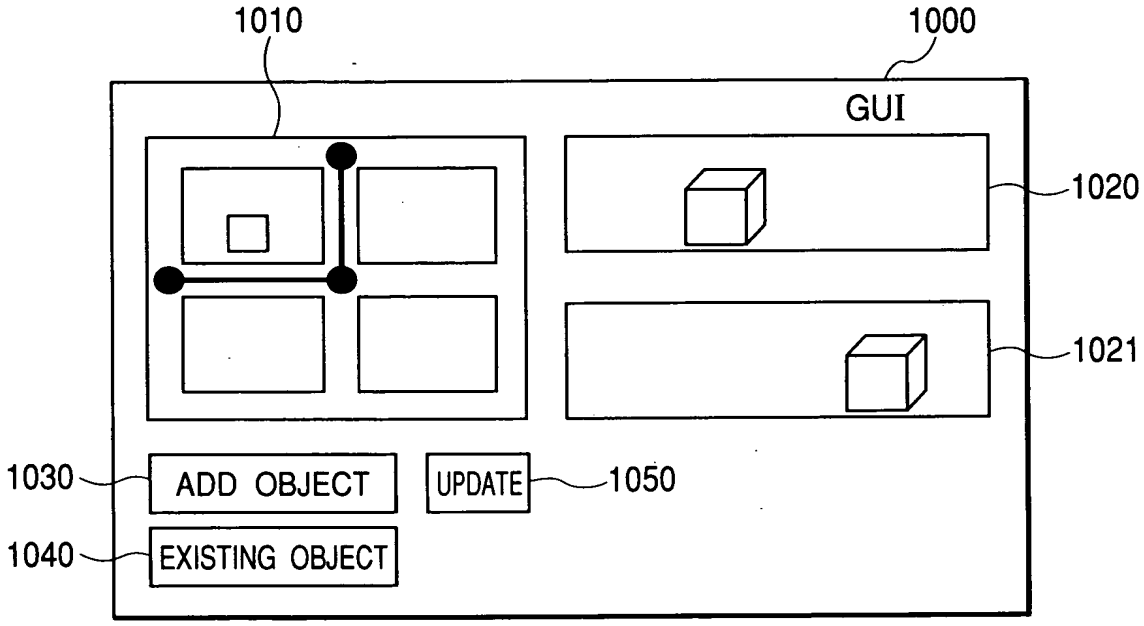
1010
1000
GUI
1020
1021
1030
ADD OBJECT
UPDATE
1050
1040
EXISTING OBJECT

FIG. 12

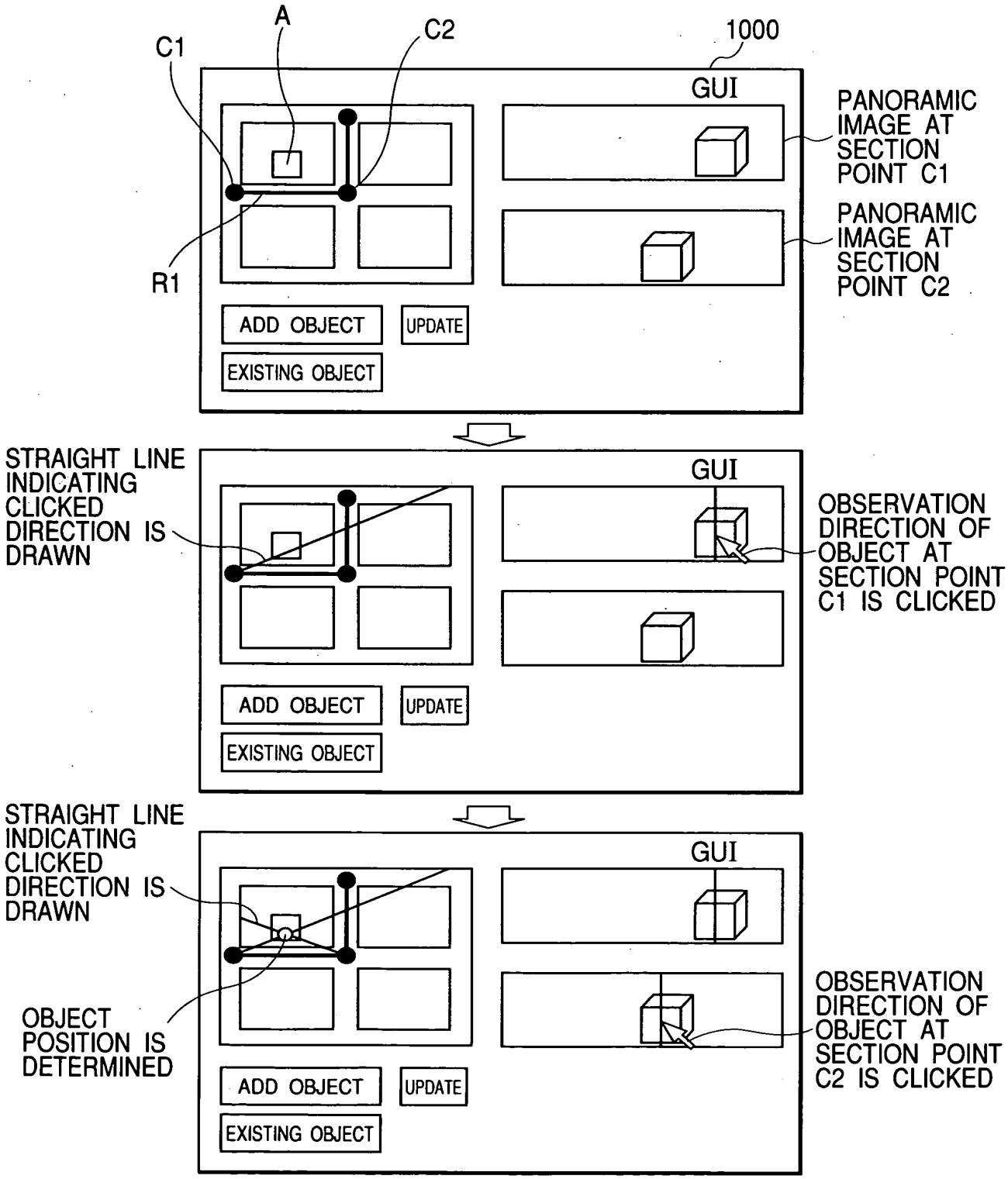
A
C1
C2
1000
GUI
PANORAMIC IMAGE AT SECTION POINT C1
PANORAMIC IMAGE AT SECTION POINT C2
R1
ADD OBJECT
UPDATE
EXISTING OBJECT
STRAIGHT LINE INDICATING CLICKED DIRECTION IS DRAWN
GUI
OBSERVATION DIRECTION OF OBJECT AT SECTION POINT C1 IS CLICKED
ADD OBJECT
UPDATE
EXISTING OBJECT
STRAIGHT LINE INDICATING CLICKED DIRECTION IS DRAWN
GUI
OBJECT POSITION IS DETERMINED
OBSERVATION DIRECTION OF OBJECT AT SECTION POINT C2 IS CLICKED
ADD OBJECT
UPDATE
EXISTING OBJECT

FIG. 13

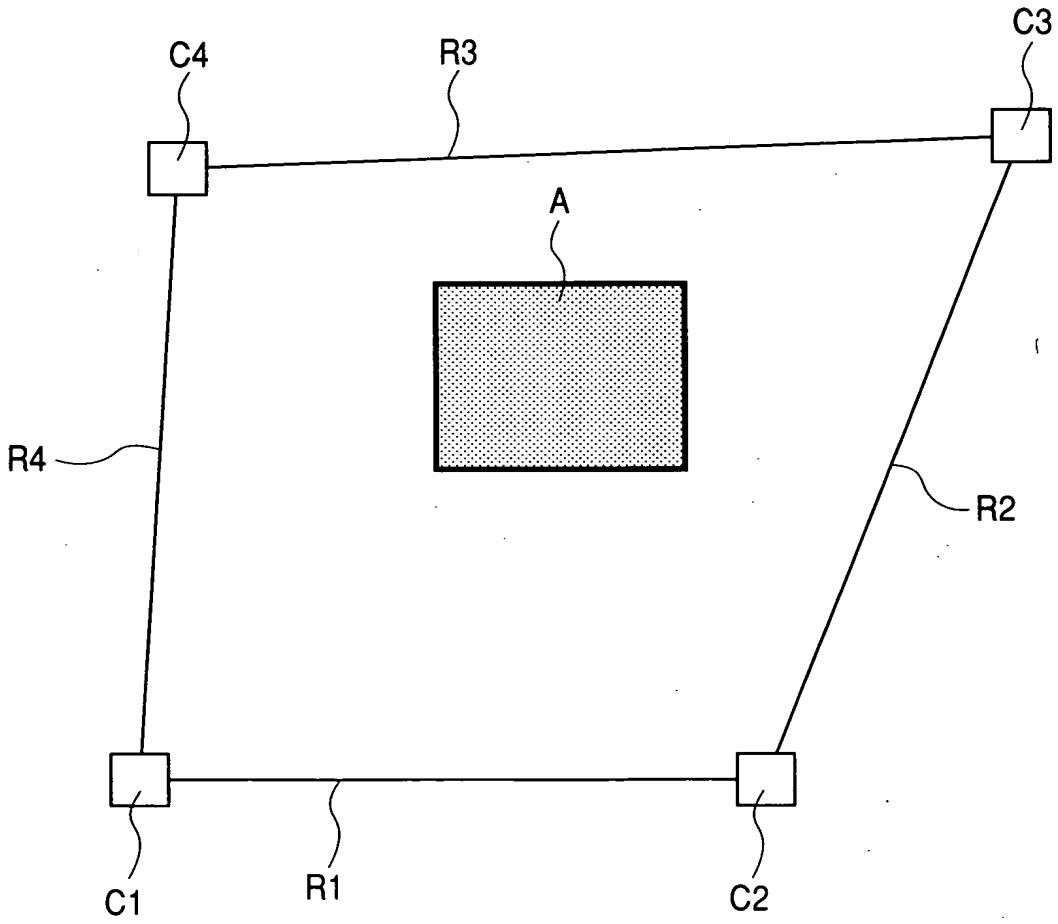

FIG. 14

OBJECT	ROUTES TO WHICH ANNOTATIONS ARE DISPLAYED	OBJECT POSITION	ANNOTATION IMAGES
BUILDING A	R1	(xo1, yo1)	BUILDING A1.jpg
	R2	(xo2, yo2)	BUILDING A2.jpg

FIG. 15

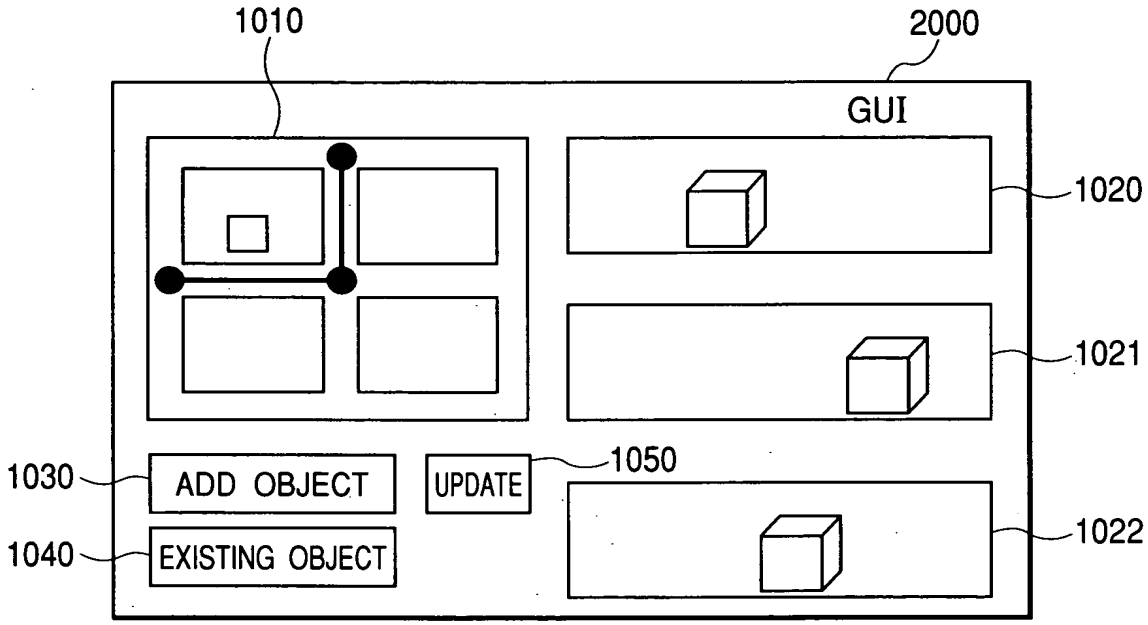
1010
2000
GUI
1020
1021
1030
ADD OBJECT
UPDATE
1050
1040
EXISTING OBJECT
1022

FIG. 16

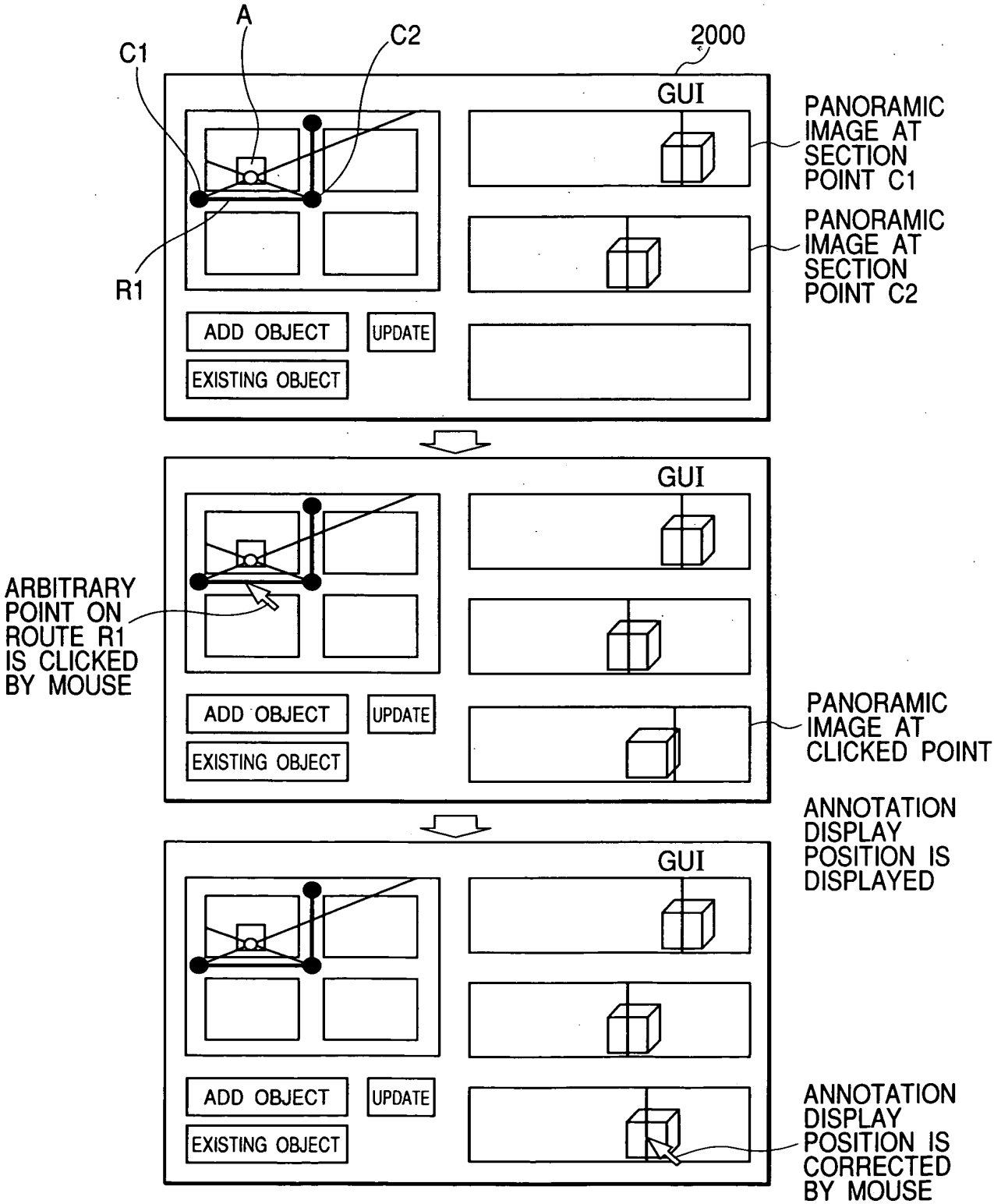
A
C1
C2
2000
GUI
PANORAMIC IMAGE AT SECTION POINT C1
PANORAMIC IMAGE AT SECTION POINT C2
R1
ADD OBJECT
UPDATE
EXISTING OBJECT
GUI
ARBITRARY POINT ON ROUTE R1 IS CLICKED BY MOUSE
ADD OBJECT
UPDATE
EXISTING OBJECT
PANORAMIC IMAGE AT CLICKED POINT
ANNOTATION DISPLAY POSITION IS DISPLAYED
GUI
ADD OBJECT
UPDATE
EXISTING OBJECT
ANNOTATION DISPLAY POSITION IS CORRECTED BY MOUSE

FIG. 17

OBJECT	ROUTES TO WHICH ANNOTATIONS ARE DISPLAYED	EXCEPTION FRAME NUMBERS	ANNOTATION DISPLAY POSITIONS	OBJECT POSITION	ANNOTATION IMAGES
BUILDING A	R1	n	θ n	(xo1, yo1)	BUILDING A1.jpg
		m	θ m		
	R2			(xo2, yo2)	BUILDING A2.jpg

FIG. 18

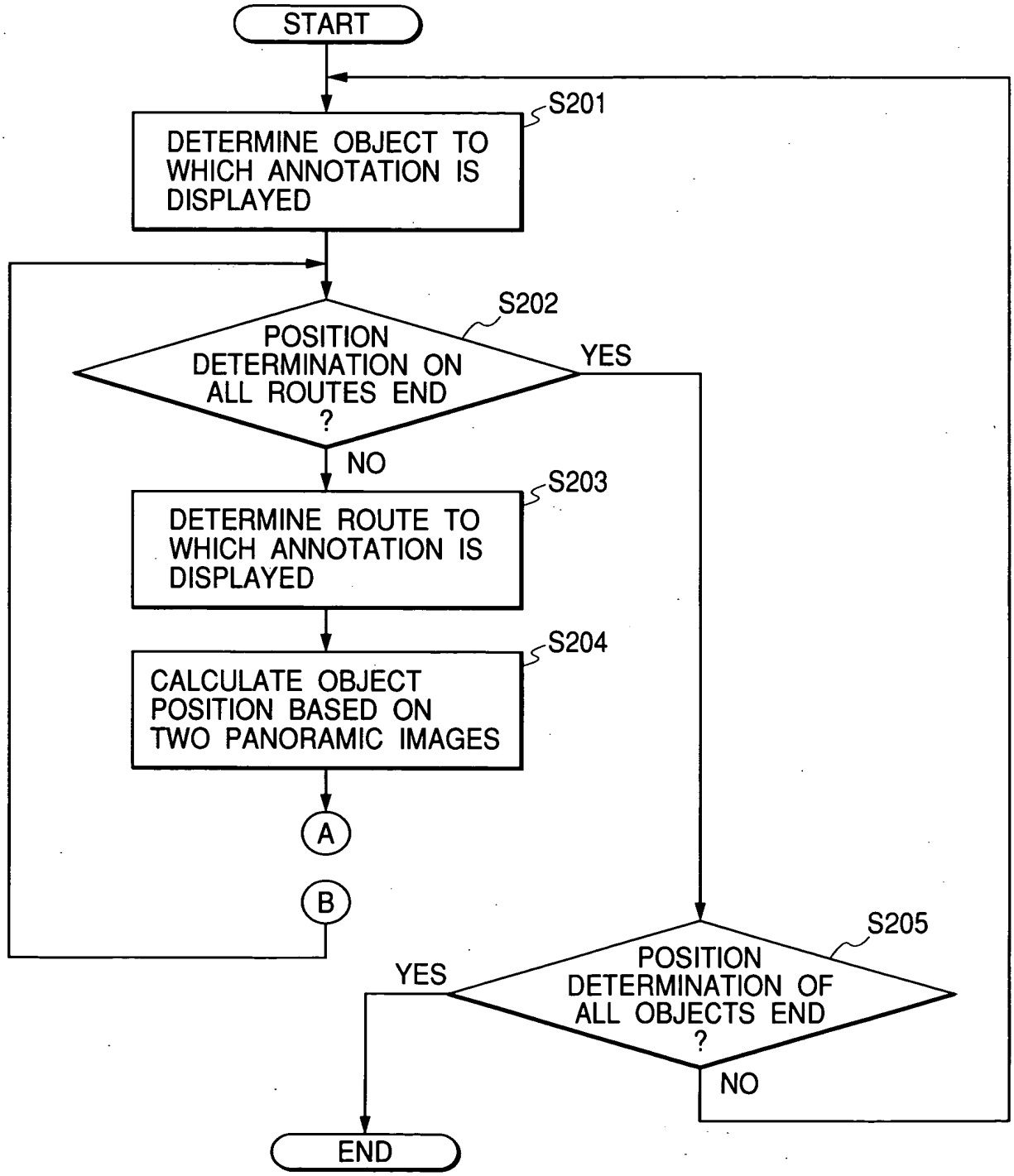
START
S201
DETERMINE OBJECT TO WHICH ANNOTATION IS DISPLAYED
S202
POSITION DETERMINATION ON ALL ROUTES END ?
YES
NO
S203
DETERMINE ROUTE TO WHICH ANNOTATION IS DISPLAYED
S204
CALCULATE OBJECT POSITION BASED ON TWO PANORAMIC IMAGES
A
B
S205
POSITION DETERMINATION OF ALL OBJECTS END ?
YES
NO
END

FIG. 19

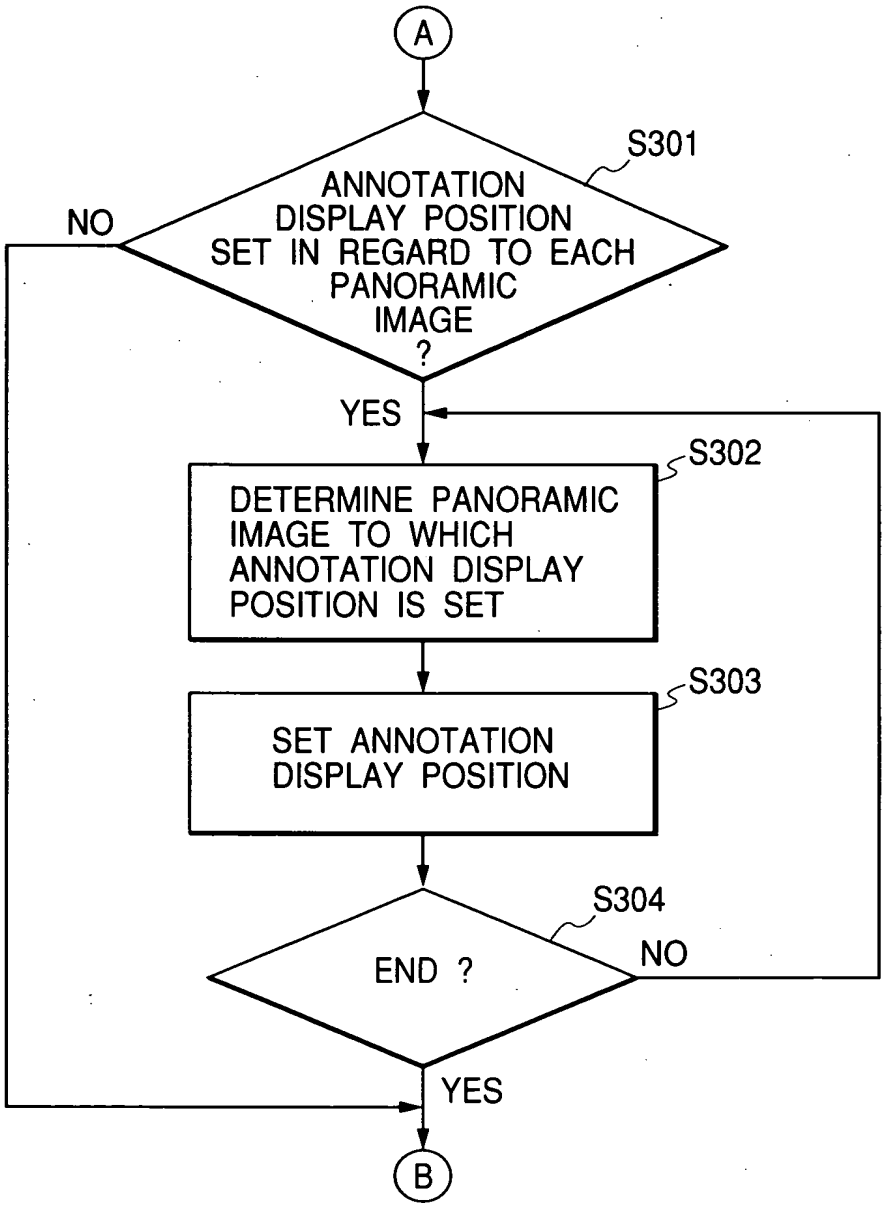
A
S301
ANNOTATION DISPLAY POSITION SET IN REGARD TO EACH PANORAMIC IMAGE ?
NO
YES
S302
DETERMINE PANORAMIC IMAGE TO WHICH ANNOTATION DISPLAY POSITION IS SET
S303
SET ANNOTATION DISPLAY POSITION
S304
END ?
NO
YES
B

FIG. 20

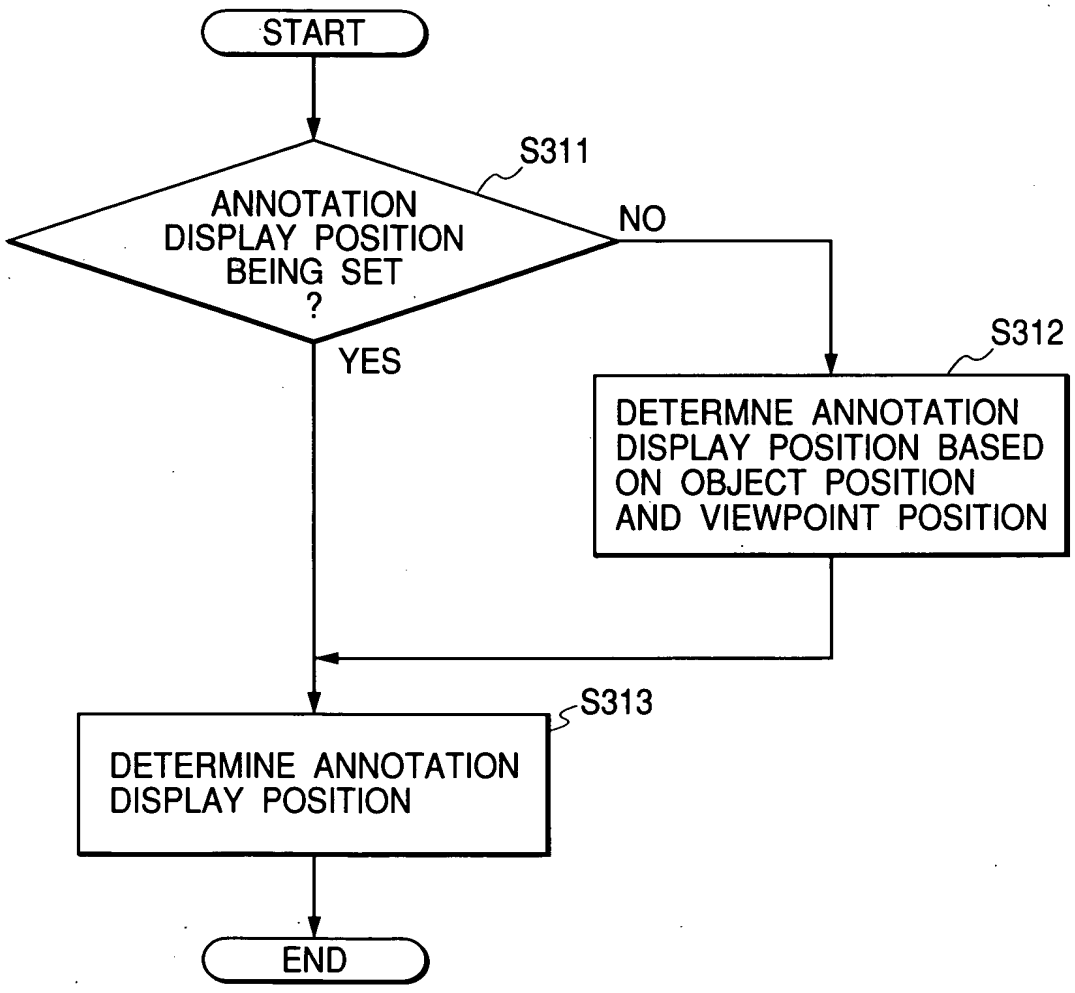
START
S311
ANNOTATION DISPLAY POSITION BEING SET ?
NO
YES
S312
DETERMNE ANNOTATION DISPLAY POSITION BASED ON OBJECT POSITION AND VIEWPOINT POSITION
S313
DETERMINE ANNOTATION DISPLAY POSITION
END

FIG. 21

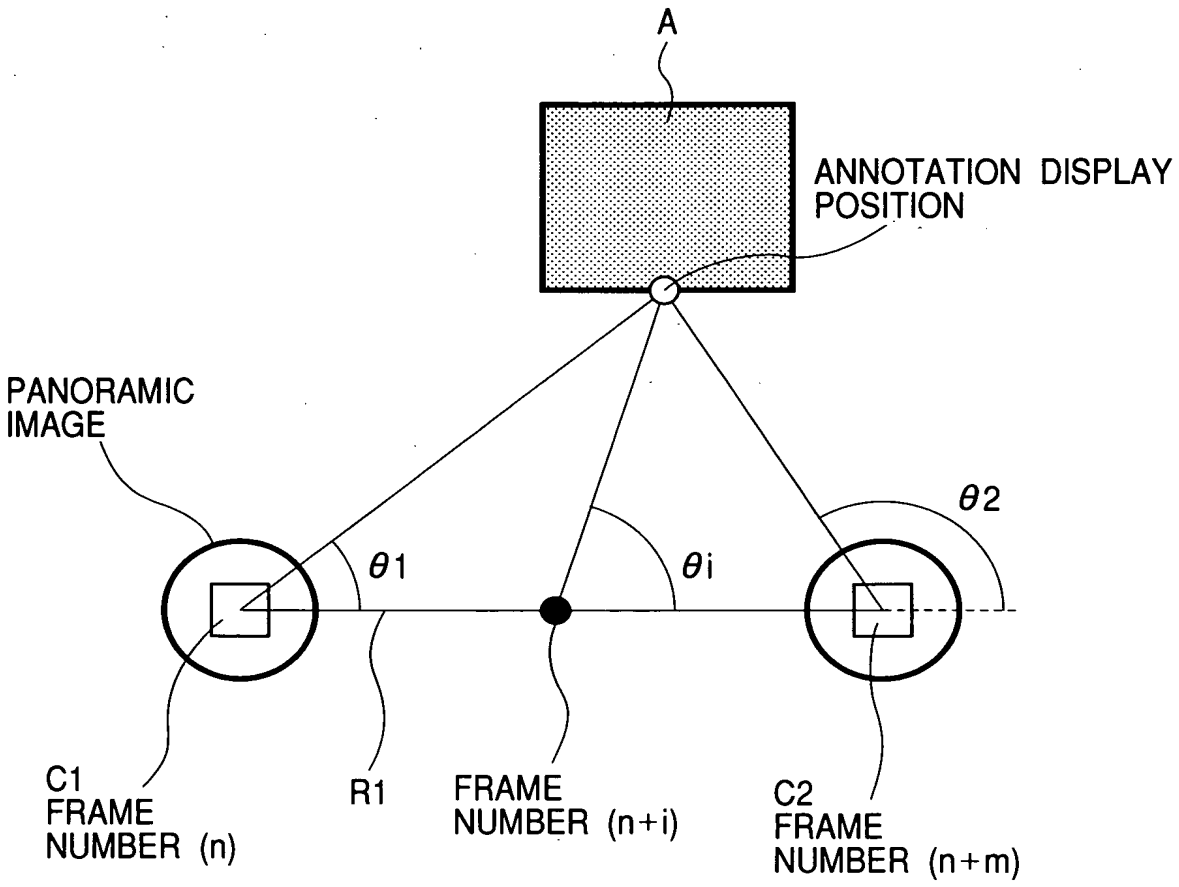
A
ANNOTATION DISPLAY POSITION
PANORAMIC IMAGE
θ1
θi
θ2
C1 FRAME NUMBER (n)
R1
FRAME NUMBER (n+i)
C2 FRAME NUMBER (n+m)

FIG. 22A

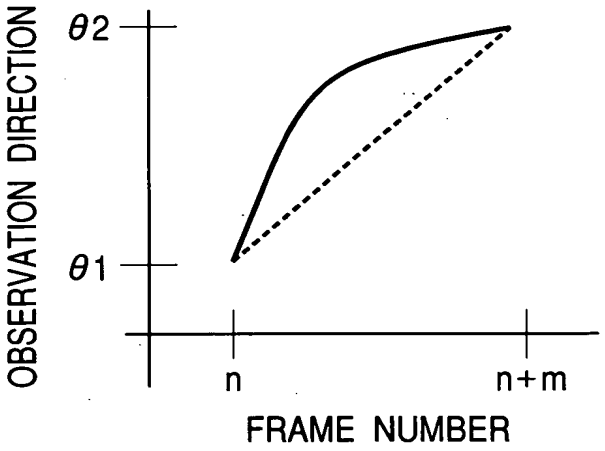

FIG. 22B

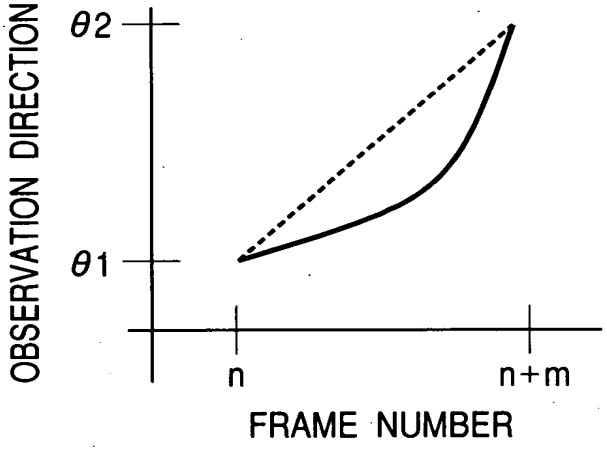

FIG. 22C

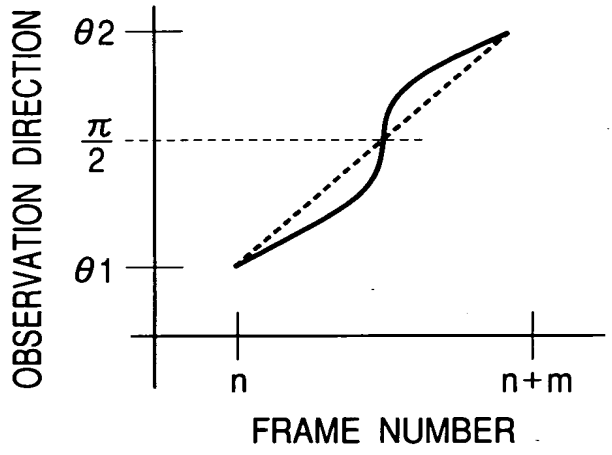

FIG. 23A

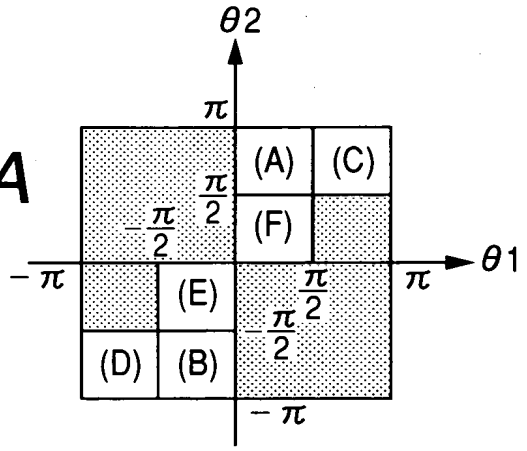

FIG. 23B

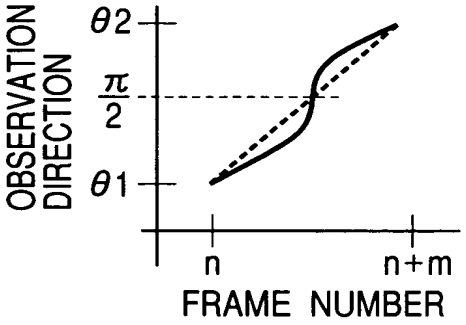

FIG. 23C

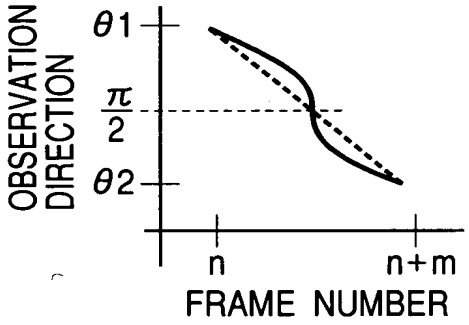

FIG. 23D

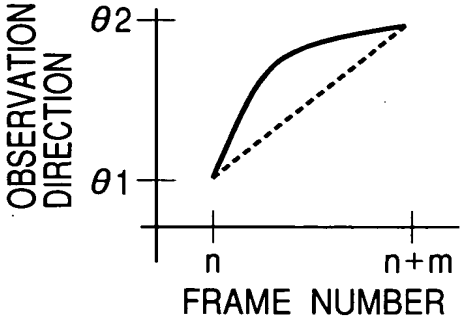

FIG. 23E

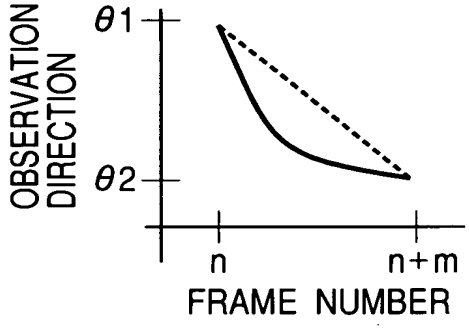

FIG. 23F

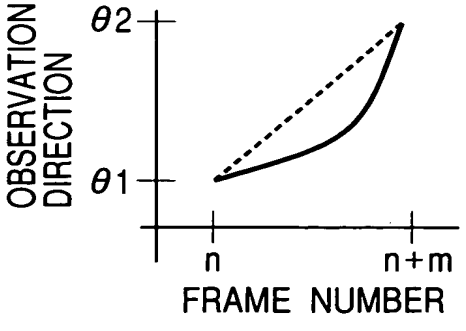
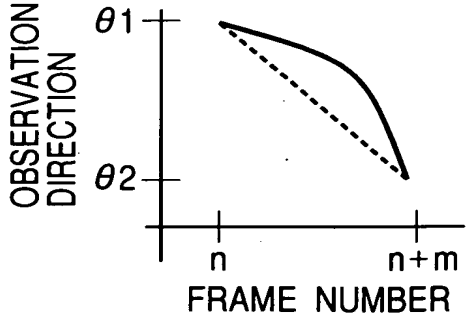
FIG. 23G